

Characterization of IR detector for Fire Measurement and Planetary Research

Completed Technology Project (2017 - 2018)



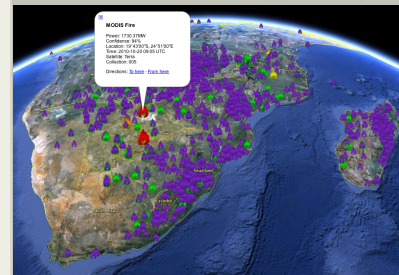
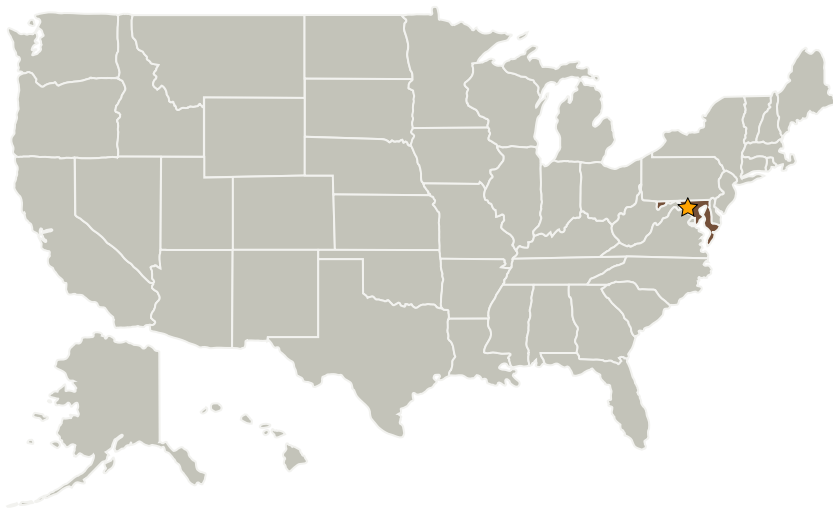
Project Introduction

We will characterize cost-friendly, high-sensitivity infrared (IT) detectors, in order to establish their capabilities to measure the full range of open fire scene temperatures at high spatial and radiometric resolutions without saturation, **as has never been accomplished from space-borne or airborne measurements hitherto**. This will enable us to build an optimal instrument that we will first fly on aircraft and ultimately on CubeSat constellations or other satellite missions. We are leveraging Goddard-developed optical components to characterize these detectors.

Anticipated Benefits

The uncertainty attributed to fire activity and emissions in earth system models is presently of the order of 100%, which is enormous, given that open fires are estimated to consume biomass containing 3.1 Gigatons of carbon annually, of which about 35% is emitted to the atmosphere, contributing about 40% of total annual emissions of black carbon and 25% of new carbon dioxide emissions, as well as numerous other particulate and gas-phase species. Results of this sensor characterization effort will enable the development of sensors that will provide accurate measurement of fire activity and emissions, in order to better quantify fires and their emissions, and thus their impacts on the environment (terrestrial and atmospheric). This effort will also provide essential parameters for use in planetary science missions, because many of the gases emitted by fires are also of great interest in surface reconnaissance and characterization of other planets, as well as the Moon, comets, and asteroids.

Primary U.S. Work Locations and Key Partners



This project will lead to the development of instruments that will significantly improve the fire detail.

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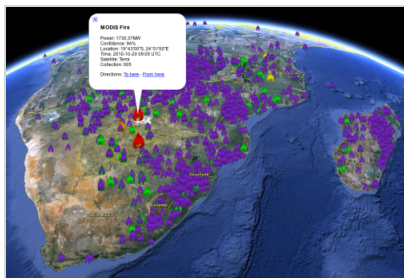


Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland

Images



Fire detections from MODIS on Terra and Aqua at 1-km resolution displayed on Google Earth, color-coded by strength

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(<https://techport.nasa.gov/image/28211>)

Project Website:

<http://science.gsfc.nasa.gov/sed/bio/charles.m.ichoku>

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Managers:

Matt McGill

William E Cutlip

Principal Investigator:

Charles M Ichoku

Co-Investigator:

Terry A Hurford

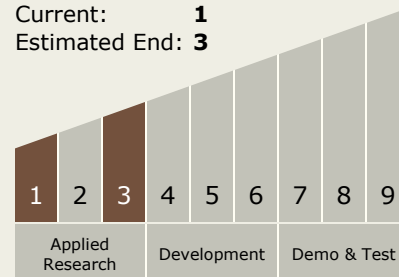
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Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **3**



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.1 Infrastructure Optimization
 - └ TX13.1.4 Propellant Production, Storage and Transfer

Target Destinations

Earth, Others Inside the Solar System